

REMARKS

The Objections to the Claims

Claim 1 was objected to. Unfortunately, the basis for the objection is not understood. The previous amendments intended to reintroduce the term "radially" to the claim, which is permitted under reissue practice. It is noted that new claim 7 presented in the last amendment does not include the term "radially."

The 112 Rejections

Claims 1 and 7 were rejected under 35 USC 112, first paragraph. Specifically, the rejection asserted that the negative limitation "whereby exposed portions of the lead frame form the only externally accessible I/O contact for the package" is not disclosed in the specification. This rejection is respectfully traversed. By way of example, such an arrangement is shown in Fig. 7 of the present application. It is noted that the Examiner has pointed out that the specification discloses that in some embodiments solder is applied to the leads. Although this is acknowledged, it is respectfully submitted that the fact that solder is applied to exposed portions of the leads does not in any way detract from the fact that even in such embodiments, the exposed (i.e. solder coated) portions of the lead frame form the only externally accessible I/O contacts for the package. Solder (or solder balls or solder columns) is simply a conductive material that adheres to the exposed contacts to facilitate mechanically attaching and electrically connecting those contacts to external devices. The solder coating does not detract from the fact that the leads are exposed.

The outstanding rejection also asserted that the specification does not disclose the step of "applying solder to exposed portions of the leads." This rejection is respectfully traversed. As pointed out by the Examiner in the sentence preceding this rejection, Col. 4, lines 36-37 disclose attaching solder balls or columns to the lower surfaces of the lead". As would readily be understood by those skilled in the art, attaching solder balls or columns is one way of applying solder to the leads. Of course there are other well-known external solder application approaches as well.

The Art Based Rejections

The pending claims have been rejected on the combination of Melton and Ogawa alone or in combination with additional references. Initially, a 131 declaration is included herewith which is believed to clearly show that the present invention was conceived before the priority date of the Melton reference. Accordingly, it is respectfully submitted that Melton is not properly considered prior art to the present patent.

Additionally (and more importantly) it is respectfully submitted that the pending claims are patentably distinct from the combinations asserted in the outstanding rejection. As presently presented, independent Claims 1 and 7 each require that the leads form the only external contacts for the resulting integrated circuit package. This is quite different than the structure contemplated by Melton. Specifically, Melton contemplates the formation of internal metallic (solder) bumps 20, which are exposed on the surface of the package opposite the lead frame 22. It is these metallic bumps that provide the electrical contacts to external devices. Melton does not appear to contemplate using exposed portions of the lead frames as his external electrical contacts. It should be appreciated that the package structure recited in claim 1 of the present application is substantially easier to produce than the package describe by Melton.

The outstanding rejection appears to acknowledge this deficiency in the Melton reference and instead asserts that it would be obvious to one of ordinary skill in the art to provide the method of Melton with the lead frame of Ogawa. This assertion is respectfully traversed. Initially it is noted that Ogawa relates to lead frames, not packages. Therefore, if a person of ordinary skill in the art were to utilized the leadframe of Ogawa in a process as taught by Ogawa, they would simply swap the lead frame disclosed by Ogawa with the lead frame 22 of Melton. If this were to occur, then resulting structure would remain substantially the same as illustrated in Figure 7 of Melton. Therefore, the combination would continue to have the same defects as discussed above with respect to Melton. In view of the foregoing, it is respectfully submitted that a prima facie case of obviousness has not been made in the present case and that the outstanding rejections of claims 1 and 7 should be withdrawn.

It is noted that in a telephone interview that occurred on April 21st, 2005, the Examiner indicated that his interpretation was that the combination of Melton and Ogawa would not include the internal metallic bumps 20 from illustrated in the Melton reference. This interpretation is respectfully traversed. As is apparent from reading the Melton reference, the entire purpose of the method disclosed by Melton was to secure internal metallic bumps 20 to a lead frame 22 (as shown in Fig. 4) and to utilize those metal bumps (rather than the lead frame) as the external contacts. Ogawa simply discloses an alternative lead frame construction. Therefore, if one were to combine Ogawa with Melton, they would simply put the metallic bumps 20 on the lead frame of Melton, which would result in a structure rather similar to Figure 4 of the Melton reference. The rest of the Melton process would remain unchanged. Indeed it would entirely defeat the purpose of Melton to eliminate the internal metallic bumps 20. Accordingly, it is respectfully submitted that a prima facie case of obviousness has not been made in the present case and that the outstanding rejections of claims 1 and 7 should be withdrawn.

Claims 2 – 6 each depend either directly or indirectly from independent claim 1 and are therefore respectfully submitted to be patentable over the art of record for at least the reasons set forth above with respect to claim 1. Additionally, some of these dependent claims require additional elements that when considered in the context of the claimed arrangements further patentably distinguish the art of record.

Claims 8 – 10 each depend either directly or indirectly from independent claim 7 and are therefore respectfully submitted to be patentable over the art of record for at least the reasons set forth above with respect to claim 1 and 7 discussed above. Additionally, these dependent claims require additional elements that when considered in the context of the claimed arrangements further patentably distinguish the art of record. These dependent claims highlight the differences in the intended usage of the present invention and the package design taught by Melton. Specifically, Melton contemplates a package arrangement wherein internal solder bumps exposed on a surface opposite the lead frame (and die) are used to mount the package to an external device (e.g., a printed circuit board). In contrast, in the arrangement recited in claims 7-10, the exposed lower surface of the package (which includes the exposed lead frame and/or the exposed die) is generally expected to be used to mount the package to external devices (e.g., a printed circuit board).

It is noted that some tertiary references are utilized in the rejections of some of the dependent claims. However it is respectfully submitted that these tertiary references do not overcome the deficiencies of the primary combination.

In view of the foregoing, it is respectfully submitted that all pending claims are patentable over the art of record and that this case is in condition for allowance. Should the Examiner have any remaining concerns regarding the present application, he is encouraged to contact the undersigned at the telephone number set out below.

Respectfully submitted,
BEYER WEAVER & THOMAS, LLP


Steve D Beyer
Reg. No. 31,234

P.O. Box 70250
Oakland, CA 94612-0250
(650) 961-8300

NSC1P225R/P03405D1-R1

-6-